**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

We claim:

1. (Currently Amended) A system for monitoring fluid flow through a passageway comprising:

a) a heater that heats a portion of the fluid in the passageway;

b) a light source that generates a beam of light that illuminates the fluid in the passageway; and

c) a light detector positioned to receive a portion of the beam, wherein the detector measures a change in the intensity of the beam caused by diffraction of the beam by the heated portion of the fluid **that** passes through the beam.

2. (Original) The system of claim 1 wherein the beam has an axis and the light detector is positioned along the axis such that the light detector measures a decreased intensity with the passage of the heated portion of the fluid.

3. (Original) The system of claim 1 wherein the beam has an axis and the light detector is displaced from the axis such that the light detector measures an increased intensity with the passage of the heated portion of the fluid.

4. (Original) The system of claim 1 wherein the beam has an axis and the fluid in the passageway has a non-uniform temperature profile along the axis when the heated portion of the fluid passes through the beam.

5. (Original) The system of claim 1 wherein the heater is an infrared laser.

6. (Original) The system of claim 1 wherein the fluid is a liquid.

7. (Original) The system of claim 1 wherein the heater is positioned a known distance upstream of the location where the beam passes through the passageway.

8. (Original) The system of claim 7 further comprising a processor that measures a time period between heating of the portion of the fluid and detection of the passage of the heated portion of the fluid by the light detector.

9. (Original) The system of claim 8 wherein the processor calculates a velocity of the fluid from the time period and the known distance between the heater and the light source.

10. (Original) A system for monitoring fluid flow comprising:

a) a passageway along which the fluid may flow such that the average flow rate is relatively high,

b) a heat source that heats a portion of the fluid in the passageway at a first position along the passageway,

c) a source that generates a light beam that illuminates the fluid in the passageway at a second position downstream from the first position, and

d) a light detector positioned to receive illumination from the source and to detect a change in intensity of the received illumination when the heated portion of the fluid passes through the beam.

11. (Original) The system of claim 10 wherein the beam has an axis and the light detector is positioned along the axis such that the light detector measures a decreased intensity with the passage of the heated portion of the fluid.

12. (Original) The system of claim 10 wherein the beam has an axis and the light detector is displaced from the axis such that the light detector measures an increased intensity with the passage of the heated portion of the fluid.

13. (Currently Amended) ~~The system of claim 10~~

**A system for monitoring fluid flow comprising:**

**a) a passageway along which the fluid may flow such that the average flow rate is relatively high,**

**b) a heat source that heats a portion of the fluid in the passageway at a first position along the passageway,**

**c) a source that generates a light beam that illuminates the fluid in the passageway at a second position downstream from the first position, and**

**d) a light detector positioned to receive illumination from the source and to detect a change in intensity of the received illumination when the heated portion of the fluid passes through the beam,**

wherein the beam has an axis and the fluid in the passageway has a non-uniform temperature profile along the axis when the heated portion of the fluid passes through the beam.

14. (Original) The system of claim 10 further comprising a processor that measures a time period between heating of the portion of the fluid and detection of the passage of the heated portion of the fluid by the light detector.

15. (Original) The system of claim 14 wherein the processor calculates a velocity of the fluid from the time period and the known distance between the heater and the light source.

16. (Original) The system of claim 10 further comprising a second light source-detector pair positioned downstream of the first-named light source and the first-named light detector such that the processor measures a time period between detection of the passage of the heated

portion of the fluid by the first-named light detector and detection of the passage of the heated portion of the fluid by the second light source-light detector pair.

17. (Original) A system for monitoring flow of a liquid through a passageway, comprising:

a heat laser that generates a first beam directed toward the passageway wherein the first beam is focused to a region at a first location within the passageway such that a localized portion of the liquid in the passageway is heated and the liquid in the passageway has a non-uniform temperature cross-section;

a sense laser that generates a second beam directed toward and focused on the passageway at a second location downstream from the first location such that the heated localized portion of the liquid will be illuminated by the second beam when the heated localized portion flows through the second beam; and

a light detector positioned to receive a portion of the second beam when the heated localized portion of the liquid passes through the second beam.

18. (Original) The system of claim 17 wherein the second beam has an axis and the light detector is positioned along the axis such that the light detector measures a decreased intensity with the passage of the localized portion of the liquid.

19. (Original) The system of claim 17 wherein the second beam has an axis and the light detector is displaced from the axis such that the light detector measures an increased intensity with the passage of the localized portion of the liquid.

20. (Original) A method of measuring flow of a liquid in a passageway, the method comprising:

a) heating a portion of the liquid in the passageway at a first position,

b) directing a beam of light from an optical source into the liquid in the passageway at a second position downstream from the first position, and

c) detecting a change in intensity in of the light from the optical source caused by diffraction of a portion of the beam when the heated portion of the fluid passes through the beam.

21. (Original) The method of claim 20 wherein the beam has an axis and the detecting action comprises measuring a decreased intensity with the passage of the heated portion of the fluid with a detector place on the axis.

22. (Original) The method of claim 20 wherein the beam has an axis and the detecting action comprises measuring an increased intensity with the passage of the heated portion of the fluid with a detector displaced from the axis.

23. (Original) The method of claim 20 further comprising measuring a time period between the heating step and detection of the passage of the heated portion of the fluid by the light detector.

24. (Original) The method of claim 23 further comprising calculating a velocity of the fluid from the time period and a distance between the first and second positions.

25. (Original) The system of claim 1, wherein the light detector is positioned to receive substantially all of a portion of the beam that passes through the entire passageway, wherein the detector measures a change in the intensity of a localized portion of the received beam caused by diffraction of the beam induced by the heated portion of the fluid.

26. (Original) A device for delivery of a liquid medicament to a subject comprising:

a system for monitoring fluid flow through a passageway according to claim 1; and

a valve for starting and stopping liquid flow in the flow tube in a periodic manner based on information from the system.

27. (Original) A device for delivery of a liquid medicament to a subject comprising:

a system for monitoring fluid flow through a passageway according to claim 9; and

a valve for starting and stopping liquid flow in the flow tube in a periodic manner based on information from the system.

28. (Original) A device for delivery of a liquid medicament to a subject comprising:

a system for monitoring fluid flow through a passageway according to claim 10; and

a valve for starting and stopping liquid flow in the flow tube in a periodic manner based on information from the system.

29. (Currently Amended) A device for delivery of a liquid medicament to a subject comprising:

a system for monitoring fluid flow through a passageway according to claim **10** **[[16]]**; and

a valve for starting and stopping liquid flow in the flow tube in a periodic manner based on information from the system.

30. (Original) A device for delivery of a liquid medicament to a subject comprising:

a system for monitoring fluid flow through a passageway according to claim 17; and

a valve for starting and stopping liquid flow in the flow tube in a periodic manner based on information from the system.

31. (Original) The method of claim 20 further comprising starting and stopping the fluid based on the detected change in intensity.

32. (Original) The method of claim 24 further comprising starting and stopping the fluid based on the calculated velocity.

33. (Original) The system of claim 17 wherein the light detector senses or measures a change in the intensity of the second beam.

34. (Original) A system for monitoring fluid flow through a passageway comprising:

a) a heater that heats a portion of the fluid in the passageway;

b) a light source that generates a beam of light that illuminates the fluid in the passageway; and

c) a light detector positioned to receive a portion of the beam, wherein the detector senses a change in the intensity of the beam caused by diffraction of the beam induced by the heated portion of the fluid.

35. (Original) The system of claim 34 wherein the beam has an axis and the light detector is positioned along the axis such that the light detector senses a decreased intensity with the passage of the heated portion of the fluid.

36. (Original) The system of claim 34 wherein the beam has an axis and the light detector is displaced from the axis such that the light detector senses an increased intensity with the passage of the heated portion of the fluid.

37. (Original) The system of claim 34 wherein the beam has an axis and the fluid in the passageway has a non-uniform temperature profile along the axis when the heated portion of the fluid passes through the beam.

38. (Original) The system of claim 34 wherein the heater is positioned a known distance upstream of the location where the beam passes through the passageway.

39. (Original) The system of claim 38 further comprising a processor that measures a time period between heating of the portion of the fluid and detection of the passage of the heated portion of the fluid by the light detector.

40. (Original) The system of claim 39 wherein the processor calculates a velocity of the fluid from the time period and the known distance between the heater and the light source.

41. (Original) The system of claim 17 wherein the second beam has an axis and the light detector is positioned along the axis such that the light detector senses a decreased intensity with the passage of the localized portion of the liquid.

42. (Original) The system of claim 17 wherein the second beam has an axis and the light detector is displaced from the axis such that the light detector senses an increased intensity with the passage of the localized portion of the liquid.

43. (Currently Amended) A method of measuring flow of a liquid in a passageway, the method comprising:

a) heating a portion of the liquid in the passageway at a first position,

b) directing a beam of light from an optical source into the liquid in the passageway at a second position downstream from the first position, and

c) measuring a change in intensity in of the light from the optical source caused by diffraction of a portion of the beam when the heated portion of the ~~fluid~~ **liquid** passes through the beam.

44. (Currently Amended) The method of claim 43 wherein the beam has an axis and the measuring action comprises measuring a decreased intensity with the passage of the heated portion of the ~~fluid~~ **liquid** with a detector place on the axis.

45. (Currently Amended) The method of claim 43 wherein the beam has an axis and the measuring action comprises measuring an increased intensity with the passage of the heated portion of the ~~fluid~~ **liquid** with a detector displaced from the axis.

46. (Original) The method of claim 43 further comprising measuring a time period between the heating action and the measurement of the change of intensity.

47. (Currently Amended) The method of claim 46 further comprising calculating a velocity of the ~~fluid~~ **liquid** from the time period and a distance between the first and second positions.

48. (Original) The system of claim 34, wherein the light detector is positioned to receive substantially all of a portion of the beam that passes through the entire passageway, wherein the detector senses a change in the intensity of a localized portion of the received beam caused by diffraction of the beam induced by the heated portion of the fluid.

49. (Original) A device for delivery of a liquid medicament to a subject comprising:

a system for monitoring fluid flow through a passageway according to claim 34; and

a valve for starting and stopping liquid flow in the flow tube in a periodic manner based on information from the system.

50. (Original) A device for delivery of a liquid medicament to a subject comprising:

a system for monitoring fluid flow through a passageway according to claim 40; and

a valve for starting and stopping liquid flow in the flow tube in a periodic manner based on information from the system.

51. (Currently Amended) The method of claim 43 further comprising starting and stopping the ~~fluid~~ **liquid** based on the detected change in intensity.

52. (Original) The method of claim 47 further comprising starting and stopping the fluid based on the calculated velocity.

53. (New) The system of claim 10, wherein the system is adapted to heat the portion of the fluid such that when the heated portion passes through the beam, the heated portion does not extend to any wall of the passageway.

54. (New) The system of claim 13, wherein the system is adapted to heat the portion of the fluid such that when the heated portion passes through the beam, the heated portion does not extend to any wall of the passageway.

55. (New) The system of claim 17, wherein the system is adapted to heat the localized portion of the liquid such that when the localized heated portion passes through the second beam, the localized heated portion does not extend to any wall of the passageway

56. (New) The method of claim 43, wherein the method further comprises heating the portion of the liquid such that when the heated portion passes through the beam, the heated portion does not extend to any wall of the passageway

57. (New) The system of claim 10, wherein the system is adapted to heat the heated portion of the fluid such that when a centroid of diffraction of the heated portion passes through the beam, a first temperature of the fluid at any first location on a surface of any wall of the passageway on a plane on which the beam is located is the same as a second temperature of the fluid as measured at the same first location prior to the centroid of diffraction passing through the beam.

58. (New) The system of claim 13, wherein the system is adapted to heat the heated portion of the fluid such that when a centroid of diffraction of the heated portion passes through the beam, a first temperature of the fluid at any first location on a surface of any wall of the passageway on a plane on which the beam is located is the same as a second temperature of

the fluid as measured at the same first location prior to the centroid of diffraction passing through the beam.

59. (New) The system of claim 17, wherein the system is adapted to heat the localized heated portion of the liquid such that when a centroid of diffraction of the localized heated portion passes through the second beam, a first temperature of the liquid at any first location on a surface of any wall of the passageway on a plane on which the beam is located is the same as a second temperature of the liquid as measured at the same first location prior to the centroid of diffraction passing through the second beam.

60. (New) The system of claim 43, wherein the system is adapted to heat the heated portion of the liquid such that when a centroid of diffraction of the heated portion passes through the beam, a first temperature of the liquid at any first location on a surface of any wall of the passageway on a plane on which the beam is located is the same as a second temperature of the liquid as measured at the same first location prior to the centroid of diffraction passing through the beam.